

What is Claimed is
Patent Claims

1. Process for laying out a cable wiring structure comprising one or more cable bundles (KBO, KBU) for an electrical system in a mechanical structure, the process involving a data processor, wherein the electrical system includes multiple devices (G1 through G6) distributed about the mechanical structure, which devices are interconnected electrically via the cable wiring structure and device-associated connectors (T1 through T5 or, as the case may be, S1 through S5), with the following characteristics:
 - a) displaying a design for a mechanical structure as an image using the data processor;
 - b) combining a wiring layout for the electrical system in the form of a transmission line data set with the representation of the mechanical design in such a manner, that connector elements (T1 through T5 or as the case may be S1 through S5) are positioned on the devices (G1 through G6) and connection transmission lines (Vij) are drawn therebetween;
 - c) laying out transmission line paths within the representation of the mechanical structure using user input devices, and assigning the connection transmission lines (Vij) to these transmission line paths;
 - d) checking the layout and assignments made according to c) for conflicts using pre-determined mechanical and/or electrical restriction criteria, and indicating conflicts; and

e) further utilizing the representation of the transmission line paths with complete assignment of the connection transmission lines (Vij) to transmission line path segments (B1 through B3), in certain cases after repeated carrying out of the steps c) and d), as designs for one or more cable bundles (KBO, KBU) with connector elements (T1 through T5 or as the case may be S1 through S5).

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2. Process according to Claim 1, thereby characterized, that the laying out of the transmission line paths includes the positioning of end points (A1A, A1B through B3B) of transmission path segments (B1 through B3).
 3. Process according to Claim 1 or 2, thereby characterized, that the laying out of transmission line paths includes the positioning of branching points.
 4. Process according to one of Claims 1 through 3, thereby characterized, that the laying out of transmission line paths includes the positioning of cable securing points (FE).
 5. Process according to one of Claims 1 through 4, thereby characterized, that the laying out of transmission line paths includes the positioning of direction changing points (U1) within a transmission line path segment (B1).
 6. Process according to one of Claims 1 through 5, thereby characterized, that the laying out of transmission line paths includes the positioning of connectors (T1 through T5 or as the case may be S1 through S5).

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7. Process according to Claim 6, thereby characterized, that the positioning of connectors (T1 through T5, S1 through S5) includes the insertion of disconnect points along the path of the transmission lines between the devices.
 8. Process according to one of Claims 1 through 7, thereby characterized, that the laid out transmission line paths are reflected as changes in the description of the mechanical structure.
 9. Process according to one of Claims 1 through 8, thereby characterized, that the connection elements (T1 through T5, S1 through S5) introduced as disconnect points are data transferred to the description of the wiring plan of the electrical system.
 10. Process according to one of Claims 1 through 9, thereby characterized, that the conflict check includes the electromagnetic compatibility of transmission lines bundled together in one segment of a cable bundle (KBO, KBU).
 11. Process according to one of Claims 1 through 10, thereby characterized, that the conflict check includes the determination of the signal attenuation of transmission line paths and the comparison thereof with acceptable values.
 12. Process according to one of Claims 1 through 11, thereby characterized, that the conflict check includes recognition of passages of transmission lines mapped through walls without disconnect points.
 13. Process according to one of Claims 1 through 12, thereby characterized, that one or more of the process steps are carried out by at least two different programs capable of running on the data processor and that data is exchanged

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between the various programs via files with compatible data formats.

14. Process for checking the electro-magnetic compatibility of multiple transmission lines of an electrical system joined together in a cable bundle (KBO, KBU), each with pre-determined electrical characteristics, in particular according to one of the preceding claims, with the following characteristics:

- a) pre-classifying a number of transmission line types;
- b) pre-defined criteria for incompatibility of transmission line type combinations;
- c) assigning transmission lines of a cable bundle (KBO, KBU) of an electrical system respectively to one of the pre-classified transmission line types;
- d) checking the transmission lines that are assembled in a cable bundle (KBO, KBU) according to the criteria for the incompatibility of transmission line types, and in the case of a recognized incompatibility, producing a conflict signal.

15. Process according to Claim 14, thereby characterized, that the transmission line type and the criteria for the incompatibility of transmission line types are pre-defined independent of any actual or concrete system.

16. Process according to Claim 14 or 15, thereby characterized, that signal forms are taken into consideration as a classification characteristic in the pre-classification of the transmission line types.

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17. Process according to one of Claims 14 through 16, thereby characterized, that the electro-magnetic radiation of the transmission line types is taken into consideration as a classification characteristic in the pre-classification of transmission line types.
18. Process according to one of Claims 14 through 17, thereby characterized, that in the pre-definition of transmission line types the sensitivity of devices (G1 through G6), connected as transmission receivers, to disturbances on the connection transmission lines (Vij) is taken into consideration as a classification characteristic.
19. Process according to one of Claims 14 through 18, thereby characterized, that transmission frequency ranges are taken into consideration as a classification characteristic in the pre-classification of transmission line types.
20. Process according to one of Claims 14 through 19, thereby characterized, that among the criteria for incompatibility of transmission line type combinations there are included logical operations associated with the presence of various transmission line types.
21. Process according to one of Claims 14 through 20, thereby characterized, that in the criteria for incompatibility of transmission line type combinations takes into consideration the number of transmission lines of the same transmission line type.
22. Process according to one of Claims 14 through 21, thereby characterized, that the conflict signal includes information regarding the type of incompatibility.

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23. Process according to one of Claims 14 through 22, thereby characterized, that in the case of conflict the incompatible transmission line is individually identified.
24. Process according to Claim 23, thereby characterized, that the incompatible transmission lines are indicated in a transmission line list using a specific manner of representation or with a particular marking.
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